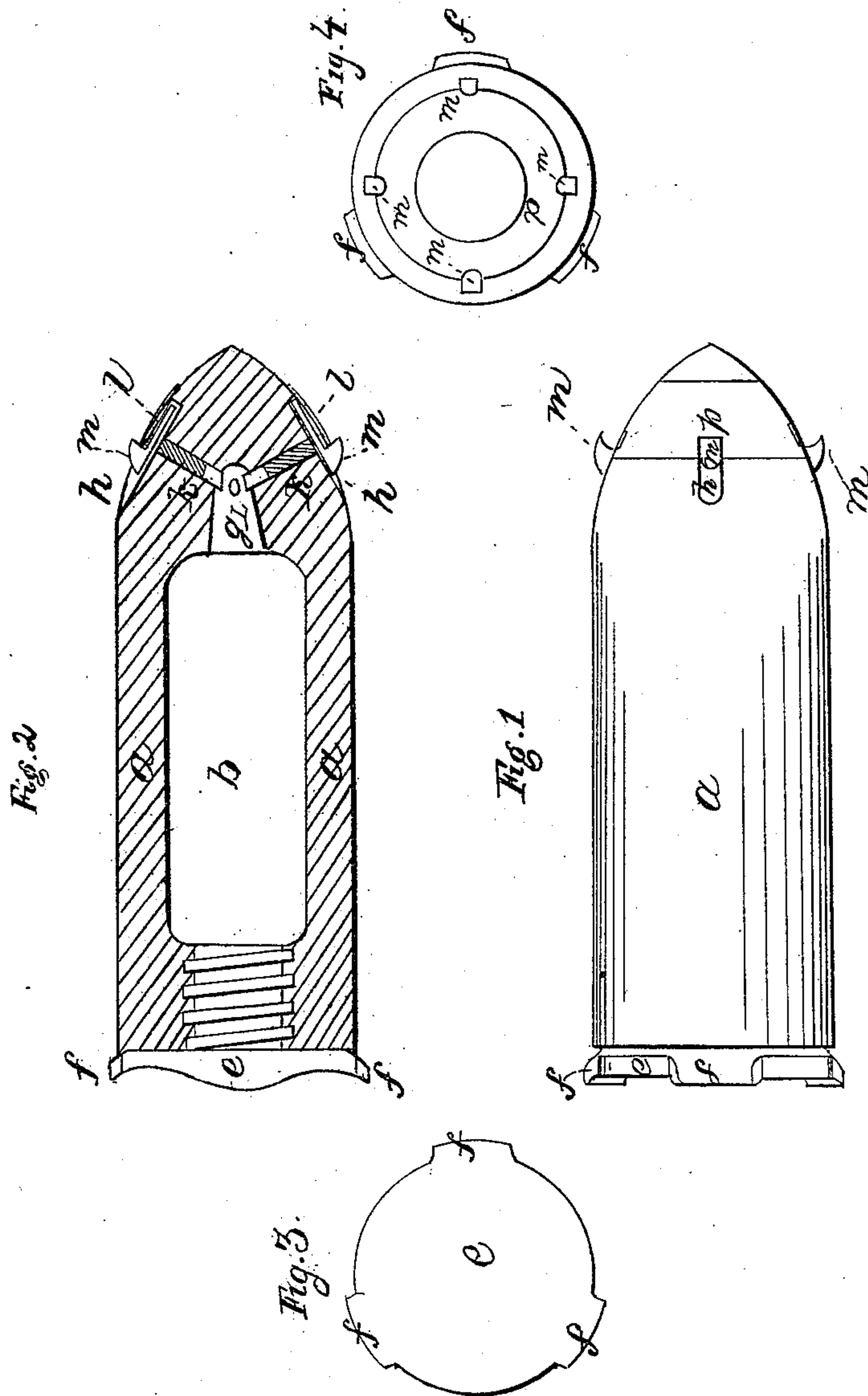


H. HELM.

Shell.

No. 41,220.

Patented Jan. 12, 1864.



Witnesses:

F. M. Magle.

James Armstrong

Inventors Signature.

Henry Helm

by his attorney

H. B. Bawell

# UNITED STATES PATENT OFFICE.

HENRY HELM, OF SALINA, KANSAS.

## IMPROVEMENT IN EXPLOSIVE SHELLS FOR ORDNANCE.

Specification forming part of Letters Patent No. 41,220, dated January 12, 1861.

*To all whom it may concern:*

Be it known that I, HENRY HELM, of Salina, in the county of Saline and State of Kansas, have invented a new and useful Improvement in Projectiles or Shells for Ordnance; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1 is an exterior side view of my improved shell. Fig. 2 is a longitudinal section through the axis of my shell. Fig. 3 is a view of the rear end or flange. Fig. 4 is a view of the front end of my shell.

In the several figures like letters of reference denote similar parts of my improved shell.

My improvement consists in the application to shells of a friction-primer so constructed and arranged as to be exploded by contact with the object it strikes, and also in combining with a friction-primer a fuse of any required length, thereby securing a reliable time-fuse for use in shells.

The objects of my improvement are, first, to accomplish the object sought to be attained by the use of percussion-shells—namely, the explosion of the shell by means of the object which it strikes—with greater certainty than is possible by the use of devices for exploding the shell by the direct impact or force of the blow, which in such shell is very frequently entirely prevented by the ricochet of the shell; second, to combine in one shell the advantages of the percussion-shell, which explodes at the moment of impact with the object struck, and the time-fuse, which explodes at a given time from the moment of firing by the use of a friction-primer, which is operated by contact with the object struck, containing a fuse so that the shell will explode at any required length of time (regulated by the length of fuse) from the moment of its striking its object.

To enable others skilled in the art to make use of my invention, I will proceed to explain the construction and operation of my improved shell.

The body *a* of the shell is made of cast-iron, and is cylindrical in shape, and pointed or otherwise shaped at the forward end, as may be desired. The shell is hollow to contain the charge. From the cavity *b* of the shell there extends to the rear end a bore of smaller diame-

ter than the cavity, the bore having a small screw cut in it to receive the screw-cap or flange-piece. The flange *c* and screw-plug *d*, together forming the screw-cap, are made of one piece of malleable cast-iron. The plug is made of such diameter as to be strong and not liable to break at its junction with the flange, and yet not so large as to leave the shell weak around it, as seen in Fig. 2. The flange *e* has lugs *f*, projecting from its periphery a short distance beyond the circumference of the body of the shell. This screw-cap may be easily screwed out when the shell is about to be put into the gun, and the charge of powder inserted in its cavity *b*, and then the screw-cap replaced and screwed down tightly. At the front end of the cavity *b* of the shell is a short bore, *g*, extending toward the point of the shell, and communicating directly with the charge-cavity *b*. From the outside of the shell, not far from the apex of its front end, a little past the point where the diameter of the shell is reduced by the tapering of the point, are four or more holes, *i*, of small diameter, which extend into the short bore *g* at the front end of the charge-cavity, as seen in Fig. 2, and over the mouth of these holes is a groove, *h*, cut into the surface of the shell. The holes *i* are to receive the fuse-tube *k* of the primer, and the grooves *h* are to receive the head *l* of the primer. The extremity of the fuse-tube of each primer enters the bore *g* in the charge-cavity of the shell, as seen in Fig. 2. The primers are made of brass or copper tube, and are like the friction-primers used for firing guns, excepting that the wire inserted into the fulminate in the head *l* of the primer has a hooked projection, *m*, outside of the primer, which protrudes slightly from the surface of the shell, but is within the line of the cylindrical portion of the shell, and also that the tube of the primer, instead of being filled with powder, only has a short fuse, which communicates with the fulminate at the outer end and with powder at the inner end. This fuse may be made longer or shorter, according to the time at which the shell is desired to explode after striking, and may either extend to the end of the tube and communicate with the powder in the shell, or, if short, it communicates with powder at the rear end of the priming-tube *k*. The head *l* of the primer lies in a



groove in the face of the shell, as before stated, but the hooked head to the wire, by which it is exploded, projects with the hook *m* turned with its end pointed toward the apex or point of the shell, so that when the shell strikes any object the hook draws out the wire and explodes the primer. A cap, *p*, made of sheet-iron, annular in shape, and fitting the conical part of the shell, is placed over the head of the primer so as to prevent their becoming displaced, the edges of the annular cap being pressed down into a slight depression made for that purpose in the surface of the shell. The annular cap *p* does not cover the hooked head *m* of the primer-wires, which project beyond it, as shown in Figs. 1 and 2.

When shells designed to explode on contact with the object fired at are made on the percussion plan, they frequently explode too soon, owing to the ricochet of the shell; or if they do not strike fairly they do not explode at all; but my shell being furnished with several primers, and the primers being so situated as that one of the hooked heads *m* will certainly be drawn out when the shell strikes the object fired at is sure to explode. If a short fuse is

used in the primer, the explosion of the primer will occur a short time before the explosion of the shell, so that if the primer should be fired by the ricochet of the shell it will have time to reach the point aimed at before the explosion. The primers may of course be used without any fuse, if preferred.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The use in shells for ordnance of friction-primers, the head of which projects from the surface of the shell so that on the impact of the shell the wire of the primer will be drawn sufficiently to explode it, substantially as described.

2. In combination therewith, the use of an adjustable time-fuse for regulating the interval between the impact and explosion, substantially as described.

In testimony whereof the said HENRY HELM has hereunto set his hand in presence of us.

HENRY HELM.

Witnesses:

R. M. CARGO,

J. C. ATTERBURY.